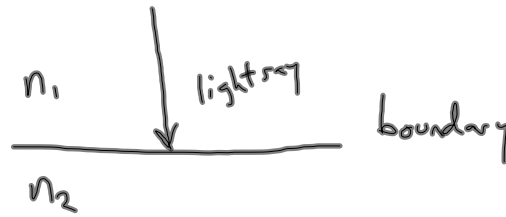


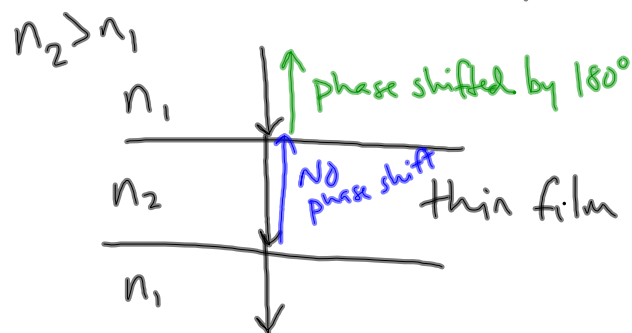
Interference, mathematically:



Remember fixed boundaries?

- Reflected wave was "flipped"
- This is called a phase shift
↳ 180°

If $n_2 > n_1$, there will be a 180° phase change of the reflected ray



- the thickness of the film can change
- When thickness is a certain amount, get constructive interference.

- The wavelength in n_2 is

$$\lambda_2 = \frac{\lambda_1}{n_2}$$

- Optical path length \rightarrow how far light travels in a medium

- If thickness of the film is h , then the optical path is $2h$.

- We can write an equation:

$$2h = m \lambda_2$$

optical path = (integer) (wavelength in n_2)
 $0, 1, 2, \dots$

$$2h = \frac{m \lambda_1}{n_2} \quad \text{Constructive interference}$$

- If the wave is shifted by half an integer, then there is destructive interference.

$$2h = (m + \frac{1}{2}) \lambda_2$$

$$2h = \frac{(m + \frac{1}{2}) \lambda_1}{n_2}$$

$m = 0, 1, 2 \dots$	Constructive	Destructive
Even # of phase shifts	$2h n_2 = m \lambda_1$	$2h n_2 = \lambda_1 (m + \frac{1}{2})$
Odd # of phase shifts	$2h n_2 = \lambda_1 (m + \frac{1}{2})$	$2h n_2 = m \lambda_1$

- Phase shift happens when light travels from $n_1 < n_2$.
- Count # of times this happens.
- Assume $m = 0$ unless told otherwise